



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 1 464 909 A2**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:

**06.10.2004 Bulletin 2004/41**

(51) Int Cl.7: **F28F 9/00, B60K 11/04**

(21) Application number: **04460003.9**

(22) Date of filing: **30.03.2004**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**

Designated Extension States:

**AL LT LV MK**

(30) Priority: **04.04.2003 PL 35954203**

(71) Applicant: **Delphi Technologies, Inc.**  
**Troy, MI 48007 (US)**

(72) Inventors:

- **Obsadny, Krzysztof**  
**63-440 Raszkw (PL)**
- **Frankiewicz, Tomasz**  
**63-400 Ostrow Wielkopolski (PL)**
- **Ben Hamida, Jamil**  
**L-3897 Foetz (BE)**

(74) Representative: **Lukaszyk, Szymon**  
**Kancelaria Patentowa Lukaszyk**  
**ul. Glowackiego 8**  
**40-062 Katowice (PL)**

(54) **Self-locking bracket**

(57) The invention relates to a self-locking bracket for fastening on U-shaped thin-walled profile and in particular for fastening on U-shaped side support of a motor vehicle radiator cooling core. The bracket has a form of a single-element shape and comprises elastic locking element (6), elastic abutting element (7) and a blocking

element (8), for fixing the bracket position in mounting slots (12) parallel to the web surface of the side support, wherein the distance between the working edge of the locking element (6) and the working edge of the blocking element (8) is greater than the distance between the working edge of the locking element (6) and the working edge of the abutting element (7).

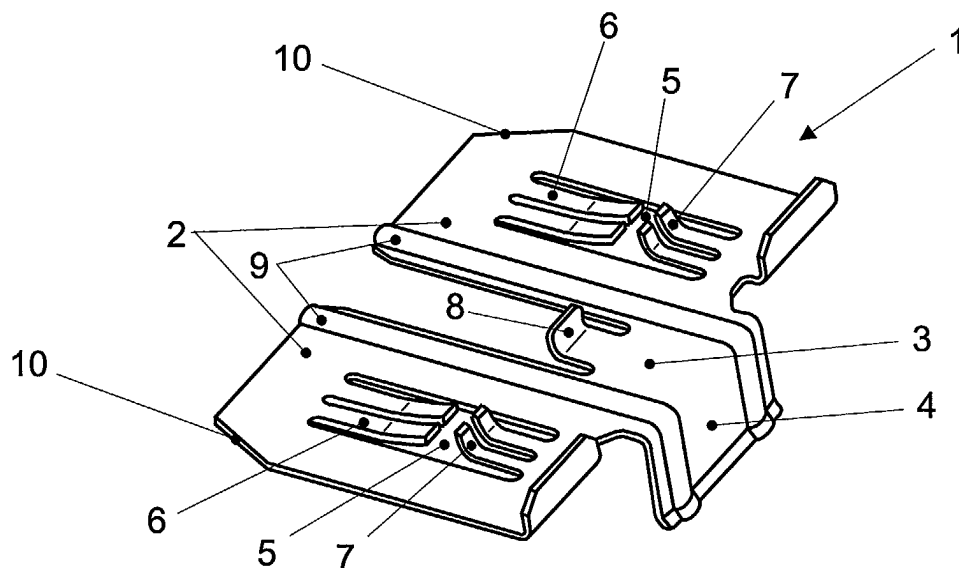


Fig. 1

EP 1 464 909 A2

## Description

**[0001]** The present invention relates to a self-locking bracket for fastening on U-shaped thin-walled profile and in particular for fastening on U-shaped side support of a motor vehicle radiator cooling core.

**[0002]** Brackets of this kind are used as supporting points or bases for fixing other elements, in particular a fan and a fan shroud. Therefore the suitable rigidity, reliability of the attachment to the side support and resistance to mechanical vibrations generated during operation of these elements are necessary.

**[0003]** The known constructions of brackets provide the required rigidity mainly by permanent fastening to the side support, e.g. by means of brazing, which disallow later detaching the bracket from the side support, for example, in order to repair or replace the component that is fixed to the bracket.

**[0004]** The aim of the present invention is a bracket that enables easy and detachable fastening to U-shaped side support of a radiator cooling core having a simple construction and which is sufficiently durable to provide reliable supporting point or a mounting base.

**[0005]** According to the present invention there is provided a self-locking bracket having a form of a single-element shape and comprising elastic locking element, elastic abutting element and a blocking element, for fixing the bracket position in mounting slots parallel to the web surface of the side support, wherein the distance between the working edge of the locking element and the working edge of the blocking element is greater than the distance between the working edge of the locking element and the working edge of the abutting element.

**[0006]** To lock the bracket, one has to slide it into the fixing slots provided in the side support until working edges of the locking elements abut from the inner side to the appropriate components or openings in the side support. The blocking element disables further sliding of the bracket into the side support and the elastic abutting element exerts the necessary force against the elastic locking element, which disables sliding the bracket out.

**[0007]** Benefiting from an appropriate location of springy locking elements, springy abutting elements and blocking elements it is possible to accomplish high reliability of fixing with simultaneous effortless assembling and disassembling of the bracket.

**[0008]** Advantageously according to the present invention the bracket comprises a cut-out embracing elastic locking element and elastic abutting element.

**[0009]** Moreover the bracket according to the present invention preferably comprises two mounting surfaces having cut-outs and connected by a joining surface embracing the blocking element.

**[0010]** Alternatively it is advantageous to make the blocking element in the cut-out.

**[0011]** Furthermore, advantageously according to the invention the locking element has a form of a pawl bent

at acute angle to a web surface of the side support and having a working edge for abutting from inside against the side support flange.

**[0012]** Alternatively advantageously the locking element has a form of a pawl bent at acute angle to a web surface of the side support and having a working edge for abutting against corresponding edges of openings in the web of the side support.

**[0013]** Apart from above, it is favourable to provide the bracket with die-stamped reinforcing beads.

**[0014]** Such beads increase longitudinal rigidity of the bracket and operational reliability of the locking, abutting and blocking elements by increasing forces exerted by elastic components.

**[0015]** It is convenient to furnish the bracket, according to the present invention, with the guiding chamfers.

**[0016]** The guiding chamfers facilitate assembling of the bracket that one may slide into the mounting slots even at acute angle to the surface of the flange.

**[0017]** Moreover, it is favourable to furnish the bracket, according to the present invention with at least one mounting plate, suitable for attaching to the bracket other components, such as a fan and its shroud.

**[0018]** The bracket of the present invention is preferably made of steel and more preferably of high-resilient steel.

**[0019]** The invention is presented below by way of examples of preferred embodiments with reference to figures of the drawing in which:

Fig. 1 shows a top axonometric view of the bracket, according to the first exemplary embodiment of the invention,

Fig. 2 shows a top axonometric view of the bracket, according to the first embodiment of the invention, after attaching the bracket to the side support of the radiator,

Fig. 3 shows lateral view of the bracket, according to the first embodiment of the invention,

Fig. 4 shows a top axonometric view of the bracket, according to the second exemplary embodiment of the invention,

Fig. 5 shows a bottom axonometric view of the bracket, according to the second embodiment of the invention, after attaching the bracket to the side support of the radiator, and

Fig. 6 shows lateral view of the bracket, according to the second embodiment of the invention,

Fig. 7 shows a top axonometric view of the bracket, according to the third exemplary embodiment of the invention.

[0020] Each exemplary embodiment 1, 1' and 1" of the self-locking bracket, shown in Fig. 1 to Fig. 7, has a form of a single-element shape, manufactured by die-stamping of the steel sheet.

[0021] The bracket 1 shown in Fig. 1 to Fig. 3 has two mounting surfaces 2 connected by the joining surface 3, which is ended with the perpendicular mounting plate 4. In each mounting surface 2 there is a cut-out 5 that embraces elastic locking element 6 and elastic abutting element 7. These elements have a form of two springy plates. Furthermore, each mounting surface comprises longitudinal die-stamped reinforcing bead 9 extending farther along the mounting plate 4, as well as guiding chamfers 10. The blocking element 8 is disposed in the joining surface 3.

[0022] As shown in Fig. 2, two mounting slots 12 are made in each of two upward-bent flanges of the U-shaped side support 11, wherein the slots are parallel to the surface of the side support web and have widths nearly the same as the widths of the mounting surfaces 2.

[0023] Attaching the bracket 1 to the side support consists of sliding the bracket, from whichever side of the side support 11 into the mounting slots 12 until the working edge of locking elements 6 interlocks from inside with a wall of the side support flange 11, which occurs by virtue of resilient force of the abutting elements 7.

[0024] The blocking element 8 performs a function of a limiter, which abutting against the side support flange from its outer side disables further insertion of the bracket 1 into the side support 11 and provides exertion of the sufficient interlocking force onto the outer side of the flange by means of appropriately shaped elastic abutting elements 7. In this way the position of the bracket is reliably secured against accidental displacement caused by e.g. vibrations of the motor vehicle radiator.

[0025] As shown in the Fig. 3, the blocking element is disposed within some distance (a) from the working edge of the locking elements 6. That distance depends on the type of the locking elements, and in presented embodiment of the bracket it equals the thickness of the side support flange. On the other hand the abutting elements 7 are located within the distance b from the locking elements 6, wherein the distance b is smaller than the distance a. Adjusting the distance b depends mainly on resilience and thickness of the metal sheet, of which the bracket is made. Furthermore, the locking elements are bent at an acute angle with respect to the surface of the side support web 11.

[0026] To detach the bracket from the side support one has to press down and hold the locking elements 6 towards the surface of the side support web 11, e.g. by using two screwdrivers, to release the bracket from the side support and slide the bracket out from the slots.

[0027] Fig. 4 to Fig. 6 show slightly different embodiment of the bracket 1' according to the present invention. In that construction the elastic elements 6' are bent at acute angle towards the surface of the side support

web 11 (in opposite direction than in the Fig. 3) and have a mounting orifices that facilitate dismounting of the bracket after its assembling, by means of a special tool. The abutting elements 7' are also of different shape.

[0028] As shown in Fig. 5, sliding the bracket 1' into the mounting slots 12 of the side support 11 leads to snapping the working edges of the locking elements 6' in appropriate working edges of openings 13, bored in the side support web 11. After fixing the bracket 1' the blocking element 8 leans, from the outside, against the side support flange 11, disabling farther insertion of the bracket and providing exertion of the sufficient interlocking force onto the outer side of the flange by elastic abutting element 7', thus reliably securing the bracket against sliding out.

[0029] As shown in the Fig. 6, similarly to the preceding embodiment, the blocking element is disposed within some distance a' from the working edge of the locking elements 6' whereas the abutting elements 7' are located within the distance b' from the locking elements 6', wherein the distance b' is lower than the distance a'. In this case the distance a' equals to the span between the working edge of the opening 13 and the outer surface of the side support flange.

[0030] To slide out the bracket one has to release the locking mechanism by pushing the locking elements 6' out of the orifices 13'.

[0031] The Fig. 7 shows one more embodiment of a self-locking bracket 1". In this case both the elastic locking element 6", the elastic abutting element 7" and the blocking element 8" are made inside the cut-out 5.

## Claims

1. Self-locking bracket for fastening on U-shaped thin-walled profile and in particular for fastening on U-shaped side support of a motor vehicle radiator cooling core, **characterised in that** it has a form of a single-element shape and comprises elastic locking element (6), elastic abutting element (7) and a blocking element (8), for fixing the bracket position in mounting slots (12) parallel to the web surface of the side support (11), wherein the distance (a) between the working edge of the locking element (6) and the working edge of the blocking element (8) is greater than the distance (b) between the working edge of the locking element (6) and the working edge of the abutting element (7).
2. Self-locking bracket according to claim 1, **characterised in that** it comprises a cut-out (5) embracing elastic locking element (6) and elastic abutting element (7).
3. Self-locking bracket according to claim 2, **characterised in that** comprises two mounting surfaces (2) having cut-outs (5) and connected by a joining

surface (3) embracing the blocking element (8).

4. Self-locking bracket according to claim 2, **characterised in that** the blocking element (8") is made in the cut-out (5). 5
5. Self-locking bracket according to claim 1 or 2, **characterised in that** the locking element (6) has a form of a pawl bent at acute angle to a web surface of the side support (11) and having a working edge for abutting from inside against the side support (11) flange. 10
6. Self-locking bracket according to claim 1 or 2, **characterised in that** locking element (6') has a form of a pawl bent at acute angle to a web surface of the side support (11) and having a working edge for abutting against corresponding edges of openings (13) in the web of the side support (11). 15  
20
7. Self-locking bracket according to claim 1 to 6, **characterised in that** it comprises die-stamped reinforcing beads (9).
8. Self-locking bracket according to claim 1 to 7, **characterised in that** it comprises guiding chamfers (10). 25
9. Self-locking bracket according to claim 1 to 8, **characterised in that** it comprises at least one mounting plate (4). 30
10. Self-locking bracket according to claim 1 to 9, **characterised in that** it is made of steel. 35
11. Self-locking bracket according to claim 10, **characterised in that** it is made of high-resilient steel.

40

45

50

55

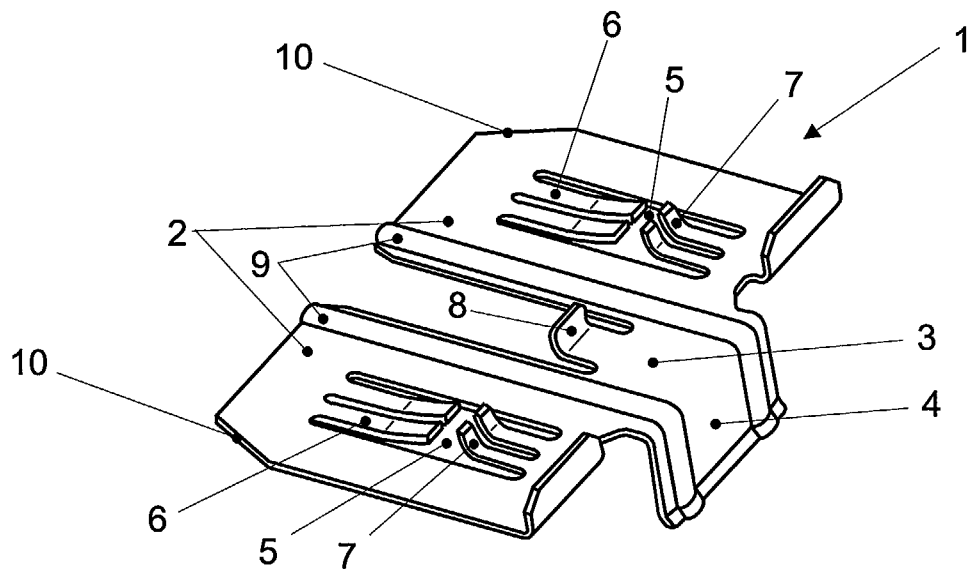


Fig. 1

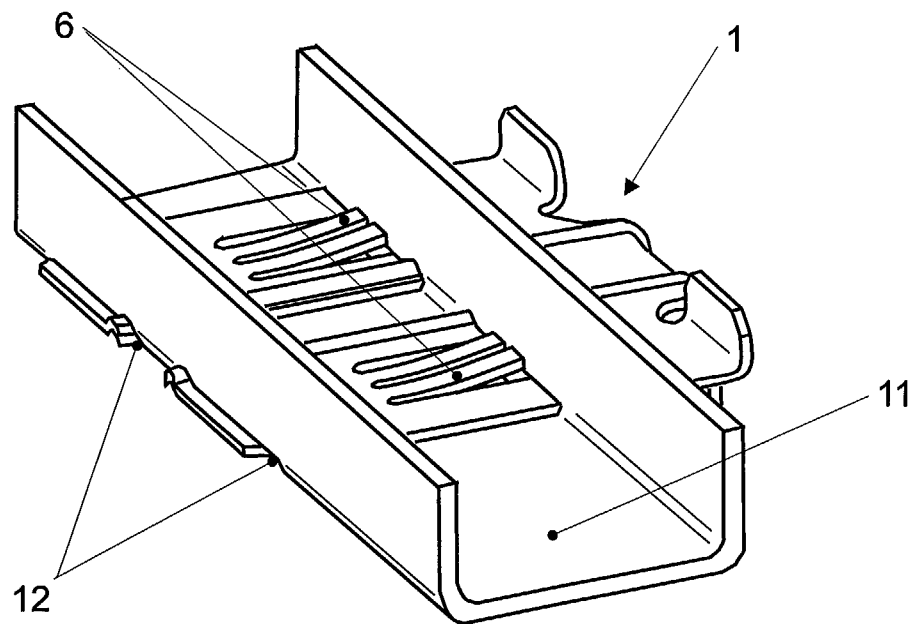


Fig. 2

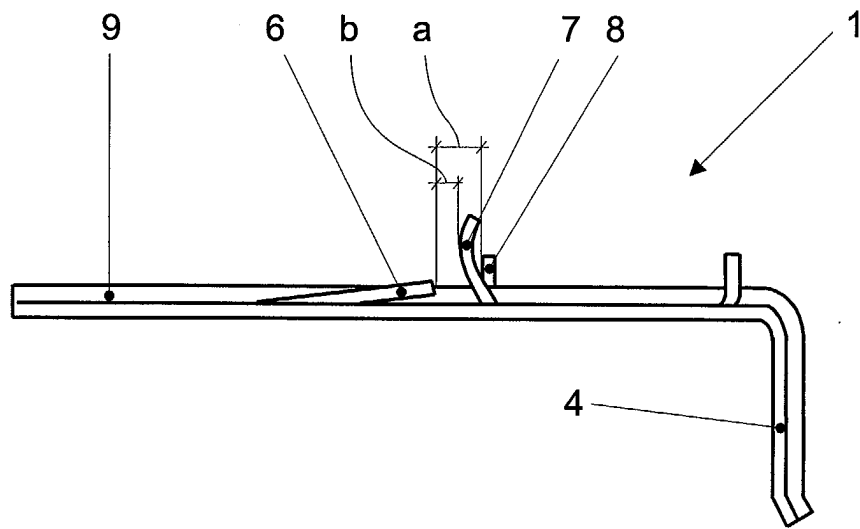


Fig. 3

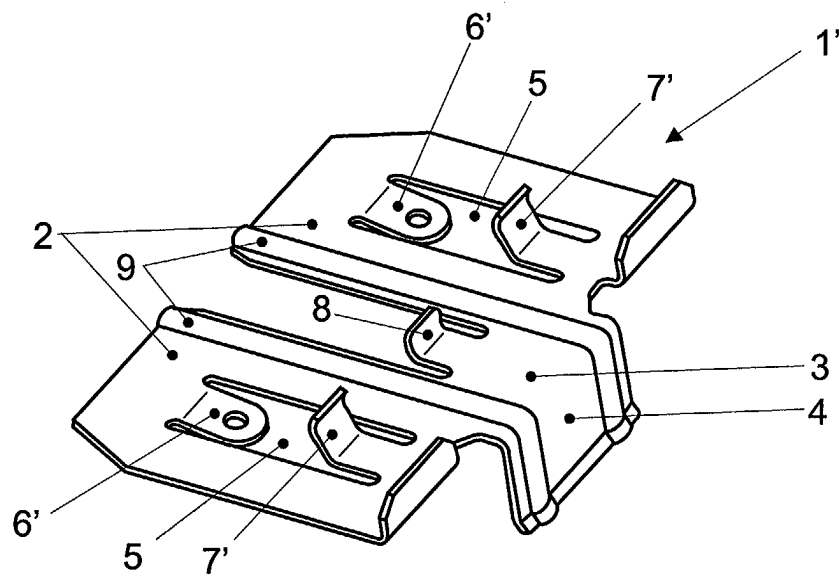


Fig. 4

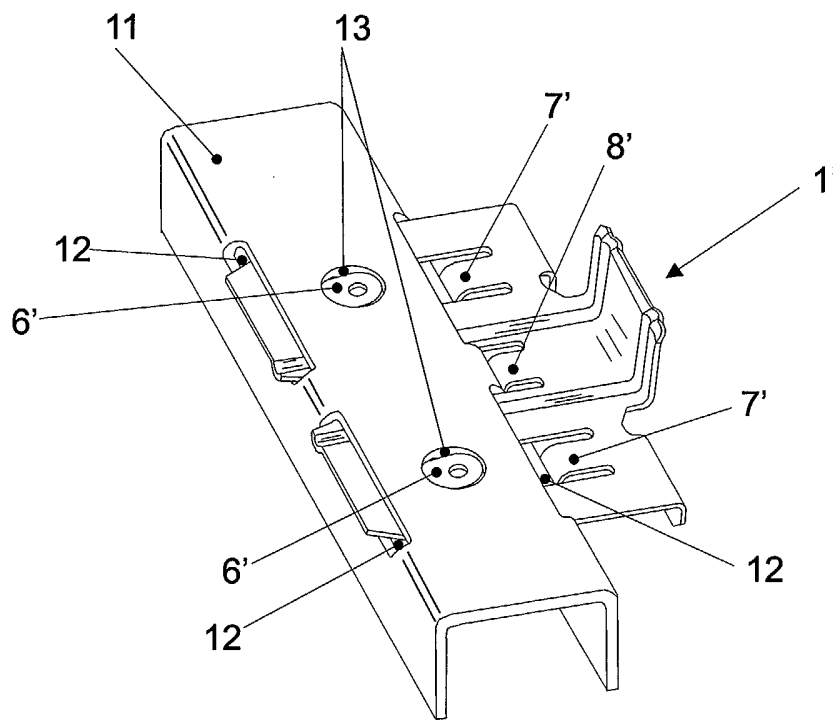


Fig. 5

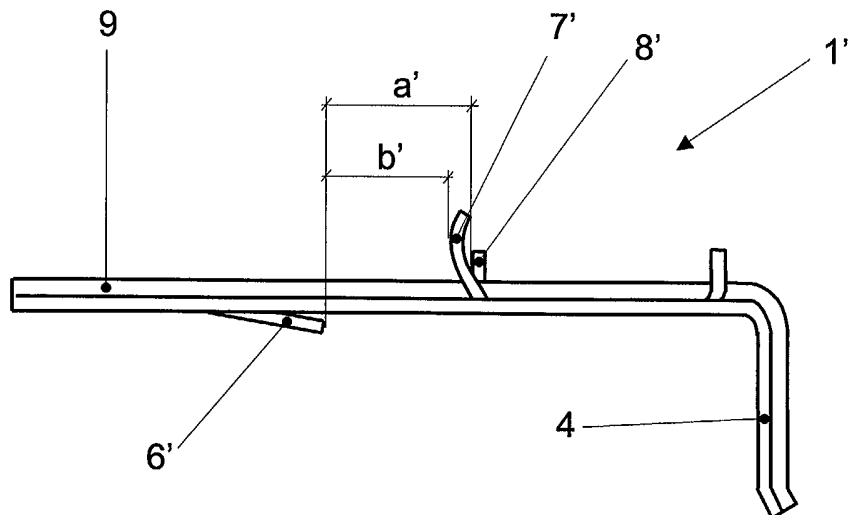


Fig. 6

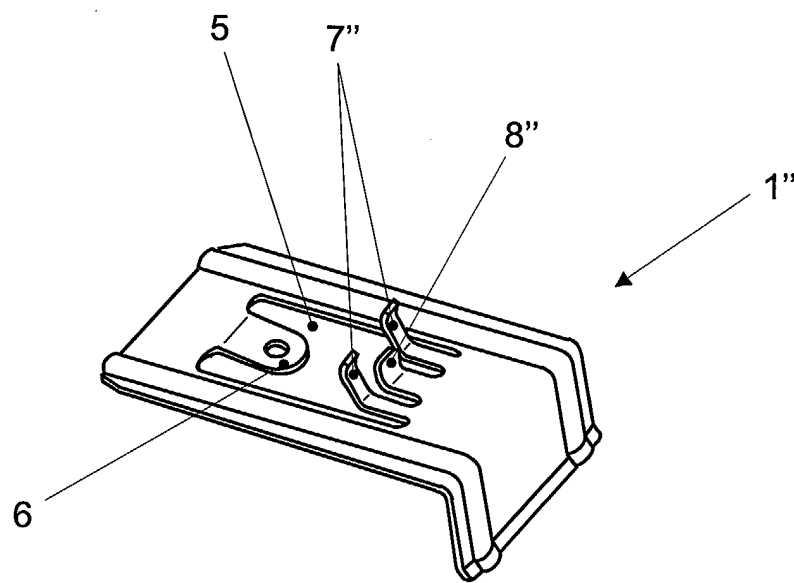


Fig. 7